

FIGURE 1  
(a) Initial state before gases turned on

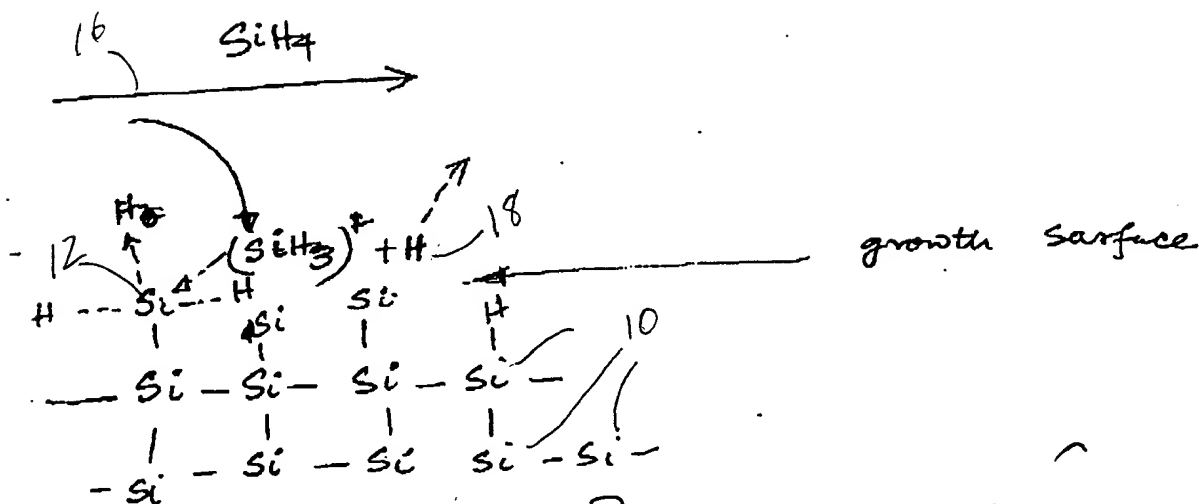


FIGURE 2  
(b)  $\text{SiH}_4$  creates activated species  $(\text{SiH}_3)^*$  on the Si surface which move around till they find a favourable site to adsorb as Si and.

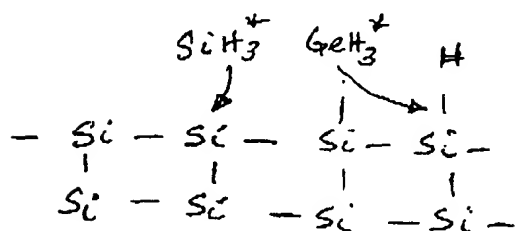
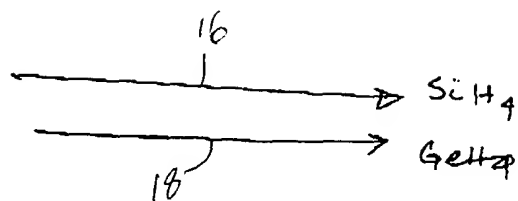


FIGURE 3

(c) presence of  $\text{GeH}_3^+$  likely weakens the Si-H bond

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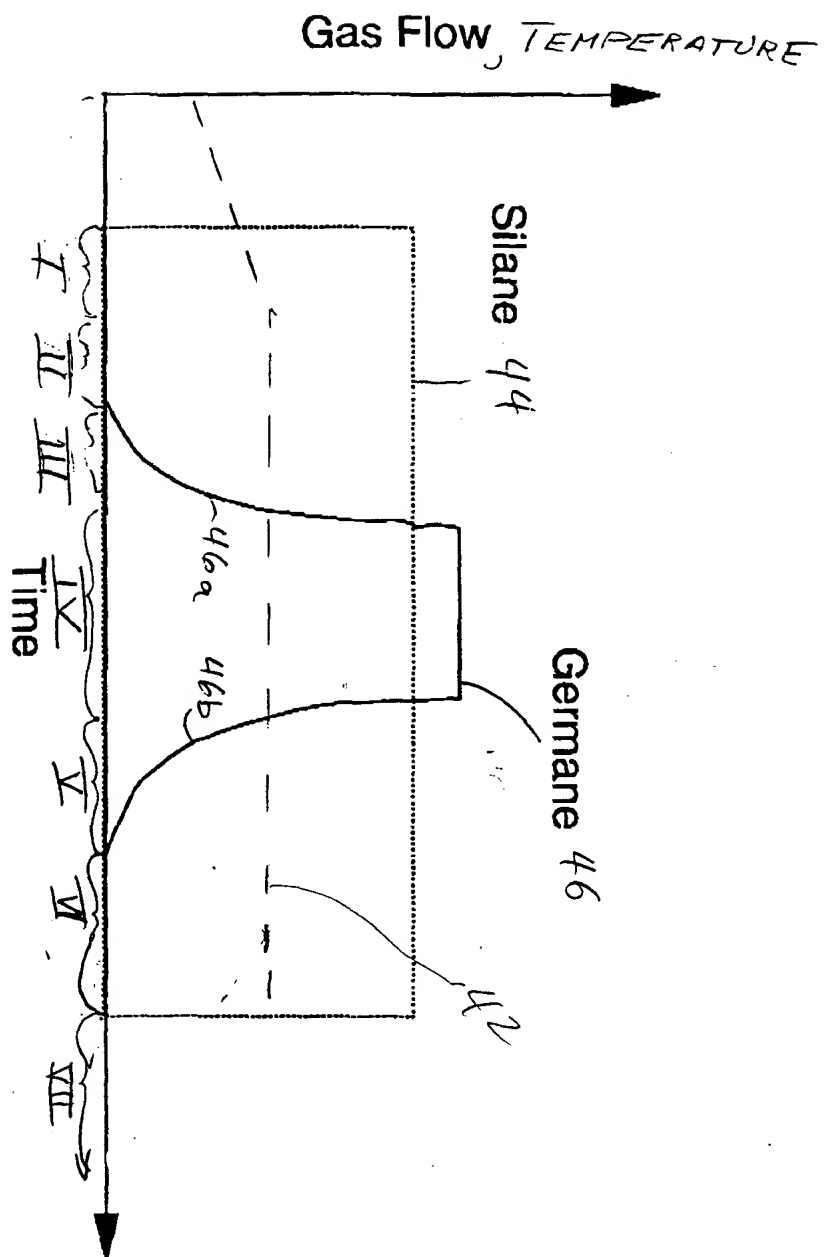


FIGURE 4

09633857-080700

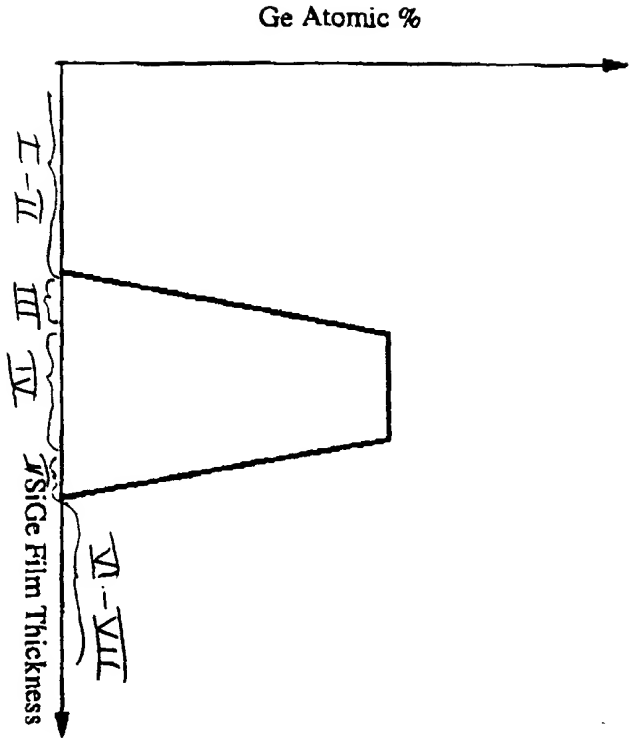


Figure 4

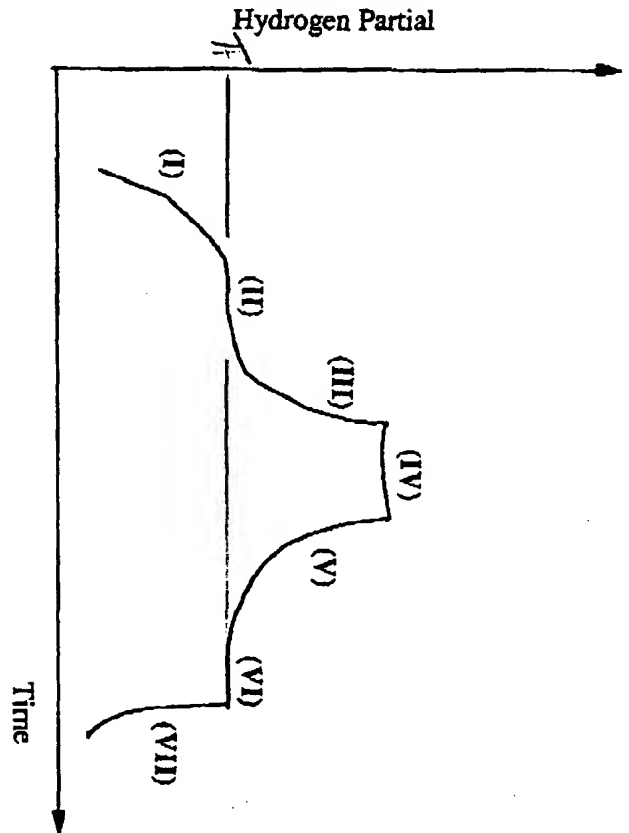
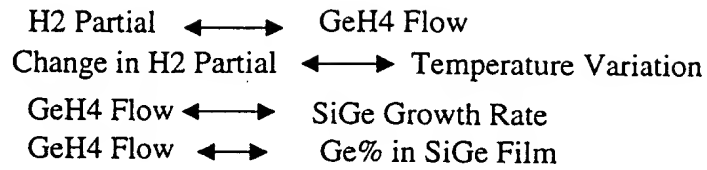


Figure 5

Determining SiGe profile: As shown in Fig. 1, the germanium profile has the following attributes; (a) Ge Plateau - Fixed Ge% for a certain film thickness, and (b) Ge Ramps - Increase/Decrease in Ge % over fixed film thickness. The usual method to determine such profiles rely on SIMS which is performed on samples after the growth is finished. SIMS is an ex-situ destructive technique which is expensive and also has a considerable turn-around time. In the invention proposed here, the attributes of the Ge profile are determined in-situ by monitoring the Hydrogen signal during the course of the growth. The Hydrogen detection is done by a Residual Gas Analysis system (RGA), which samples the gas

1. Generate Calibration Data



2. In-situ Determination of Ge% 'vs' Film Thickness

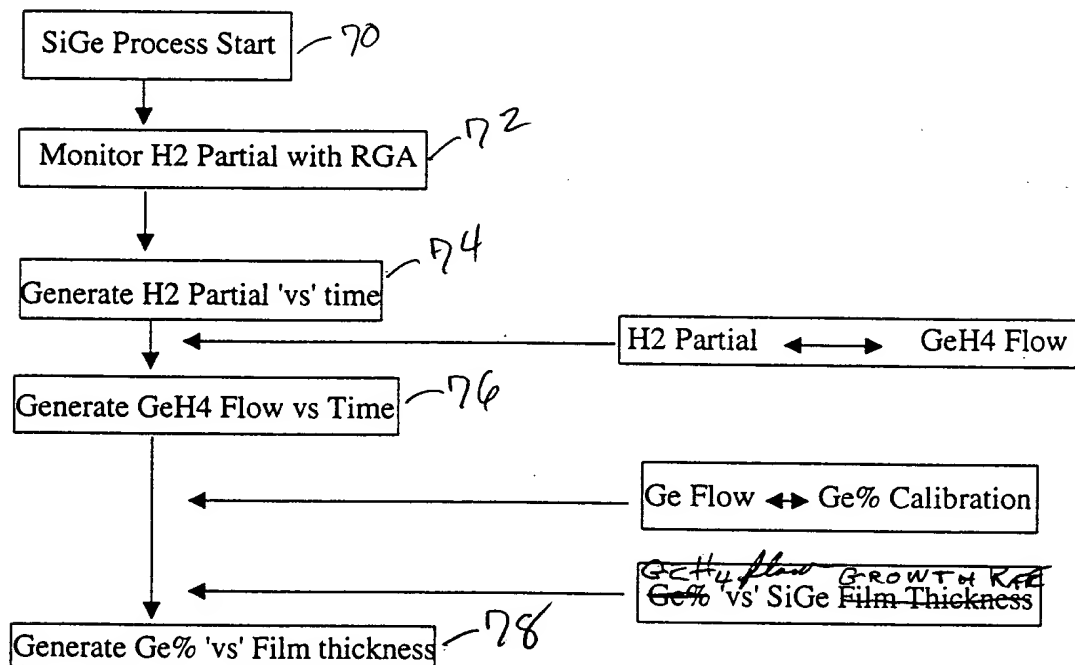


FIGURE 7

### 3. Temperature Monitoring

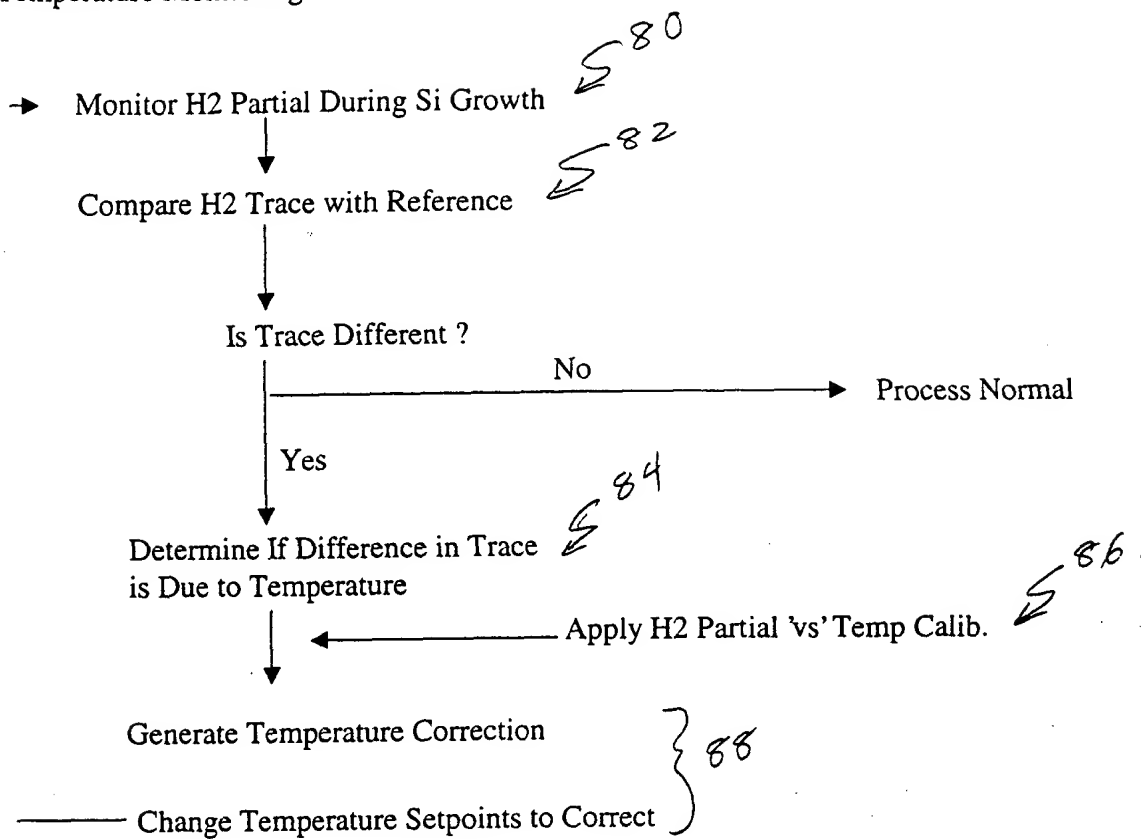


FIGURE 8

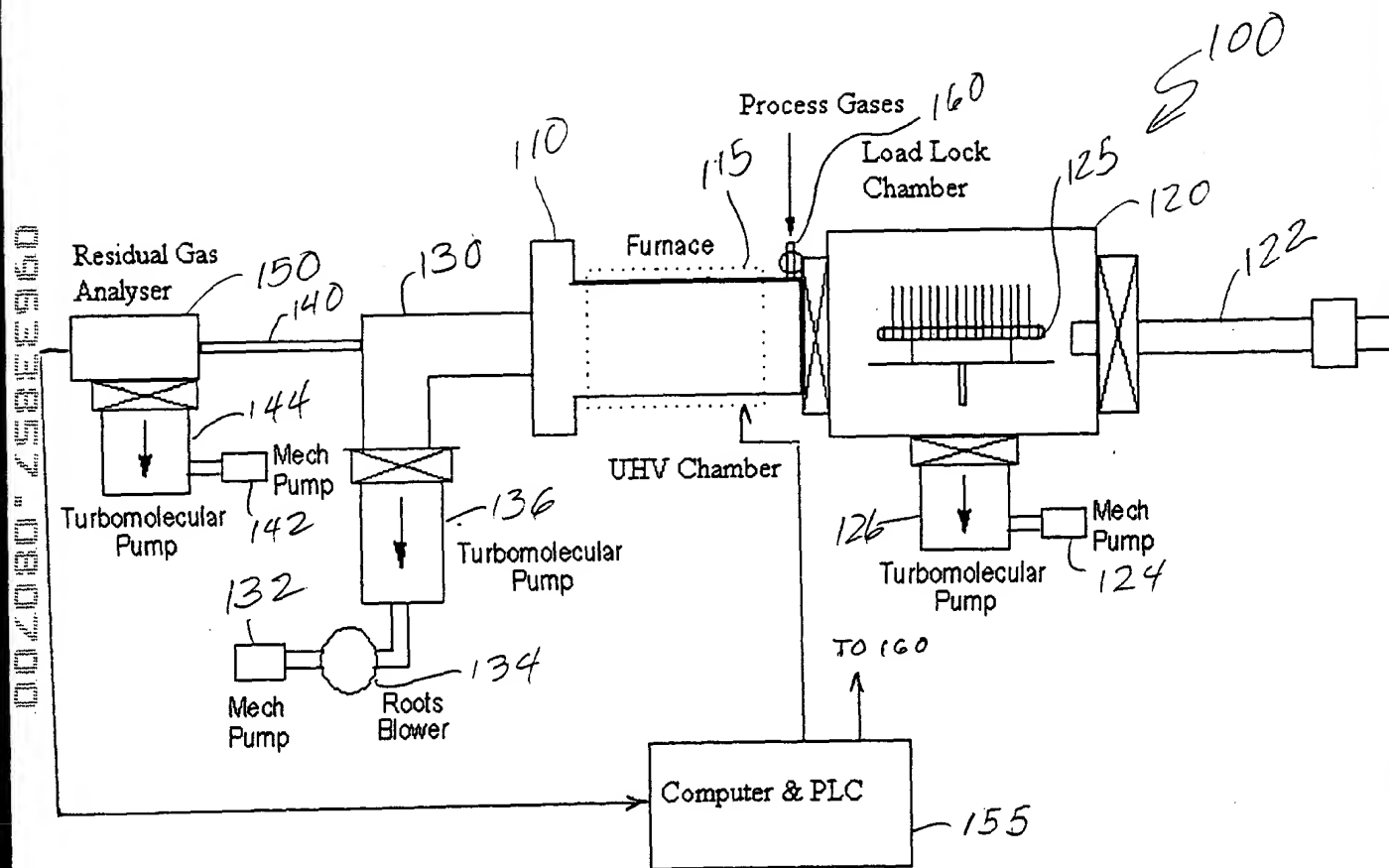


FIGURE 9.